

PROJECT NAME

FLARE

BASED ON
ZVEX Fuzz Factory

EFFECT TYPE
Fuzz

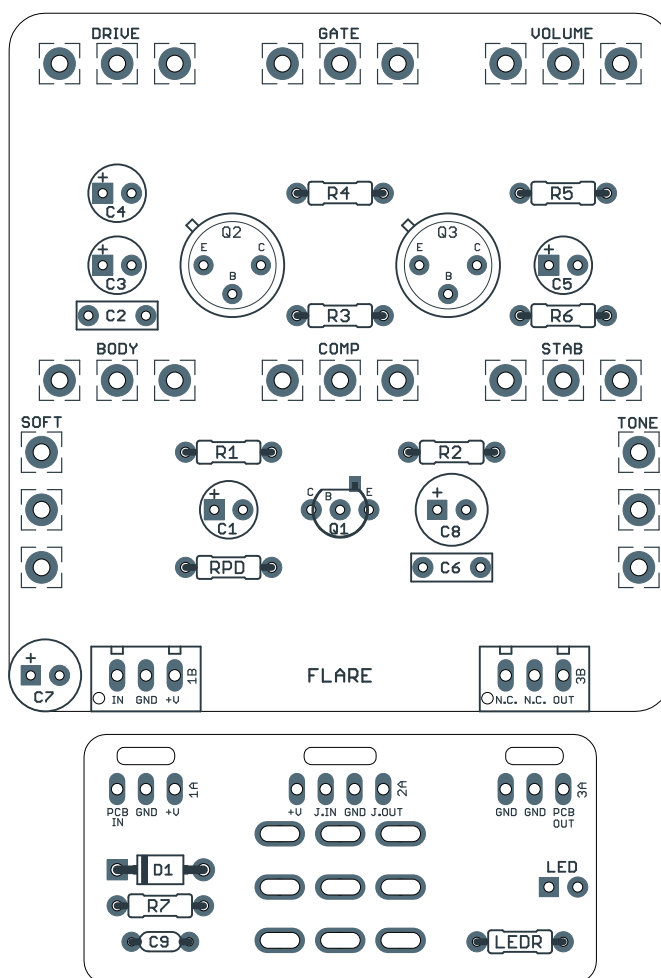
BUILD DIFFICULTY
■■■■■ Easy

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1.0.1 (2024-08-08)

aion
DIY GUITAR EFFECTS

PROJECT SUMMARY

A glitchy silicon/germanium hybrid fuzz known for its dizzying array of controls and untamed sounds.



Actual size is 2.3" x 2.42" (main board) and 1.78" x 0.86" (bypass board).

IMPORTANT NOTE

This documentation is for the **PCB-only** version of the project. If you are building the full kit from Aion FX, please use the [kit build documentation](#) instead. The instructions are more detailed and may differ in some areas due to the specialized parts and assembly methods used in our kits.

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INTRODUCTION

The Flare Fuzz Machine is a clone of the ZVEX Fuzz Factory, a really interesting little box first released in 1995. It's essentially a classic Fuzz Face with a LPB-1 booster in front of it, but with the twist that half of the components are replaced with knobs, allowing fine-grain control over the transistor bias and letting you create everything from a really thick-yet-musical fuzz, to gated velcro-ripping, to some pretty crazy pitch-oscillation.

This is not a user-friendly pedal by any means. The knobs are very interactive, and there are a lot of setting combinations that straight-up don't work. But if you start with some default knob settings, you can get a good feel for what it's capable of. See page 5 for suggested starting points.

The Fuzz Factory is notable for being custom-built directly into the guitars of Matthew Bellamy of Muse. He uses it for his main drive tone as well as for feedback & oscillation purposes, controlling the effect via the Stability and Compression knobs which are mounted to the front of the guitar.

The Flare is a close adaptation of the Fuzz Factory, but with 8 knobs while the original only has 5. The added knobs are Softness (gain reduction of the input boost stage), Body (bass blend before the fuzz) and Tone (treble cut after the fuzz).

USAGE

- **Drive** controls the amount of fuzz, equivalent to an overdrive's gain control. This also turns into something of a feedback pitch control when the Stability is reduced.
- **Level** is the output level of the effect.
- **Comp** (compression) changes the attack. It is heavily affected by the Stability control.
- **Stability** reduces the +9V supply to change the bias of the whole circuit, changing the overall character of all of the knobs and eventually throwing it into oscillation.
- **Gate** turns off the transistor when the signal is below the threshold. Useful for creating glitchy velcro-ripping sounds.
- **Soft** reduces the gain of the first boost stage, which rounds out the fuzz a bit and gives it more of an overdrive character.
- **Body** is an input capacitor blend that fades between a 100n and 10uF capacitor. This increases the bass and thickens up the effect.
- **Tone** is a classic SWTC (Stupidly Wonderful Tone Control) appended to the end of the circuit to allow the treble content to be tamed a bit.

PARTS LIST

This parts list is also available in a spreadsheet format which can be imported directly into Mouser for easy parts ordering. Mouser doesn't carry all the parts (most notably potentiometers) so the second tab lists all the non-Mouser parts as well as sources for each.

[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	120k	Metal film resistor, 1/4W	
R2	10k	Metal film resistor, 1/4W	
R3	47k	Metal film resistor, 1/4W	
R4	470R	Metal film resistor, 1/4W	
R5	5k1	Metal film resistor, 1/4W	
R6	220k	Metal film resistor, 1/4W	
R7	100R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor.
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	10uF	Electrolytic capacitor, 5mm	
C2	10n	Film capacitor, 7.2 x 2.5mm	
C3	10uF	Electrolytic capacitor, 5mm	
C4	10uF	Electrolytic capacitor, 5mm	
C5	10uF	Electrolytic capacitor, 5mm	
C6	18n	Film capacitor, 7.2 x 2.5mm	
C7	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C8	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C9	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
Q1	2N3904	BJT transistor, NPN, TO-92	
Q2	Germanium	Germanium transistor, PNP	Recommended to buy a selected Fuzz Face set (Small Bear Electronics or eBay). See build notes for more info.
Q3	Germanium	Germanium transistor, PNP	
DRIVE	10kB	16mm right-angle PCB mount pot	
GATE	10kB	16mm right-angle PCB mount pot	
VOL.	5kB	16mm right-angle PCB mount pot	
BODY	100kB	16mm right-angle PCB mount pot	
COMP	10kB	16mm right-angle PCB mount pot	
STAB	10kB	16mm right-angle PCB mount pot	
SOFT	100kB	16mm right-angle PCB mount pot	
TONE	10kB	16mm right-angle PCB mount pot	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
LED	5mm	LED, 5mm, red diffused	
IN	1/4" mono	1/4" phone jack, closed frame	Switchcraft 112BX or equivalent.
OUT	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X or equivalent.
DC	2.1mm	DC jack, 2.1mm panel mount	Mouser 163-4302-E or equivalent.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

BUILD NOTES

Starting control settings

The Fuzz Factory is a very fun but very glitchy beast. If you fire it up for the first time with the knobs in random positions, you may be very disappointed in what you hear. Use these positions as a starting point and then adjust it from there to get the sounds you're after.

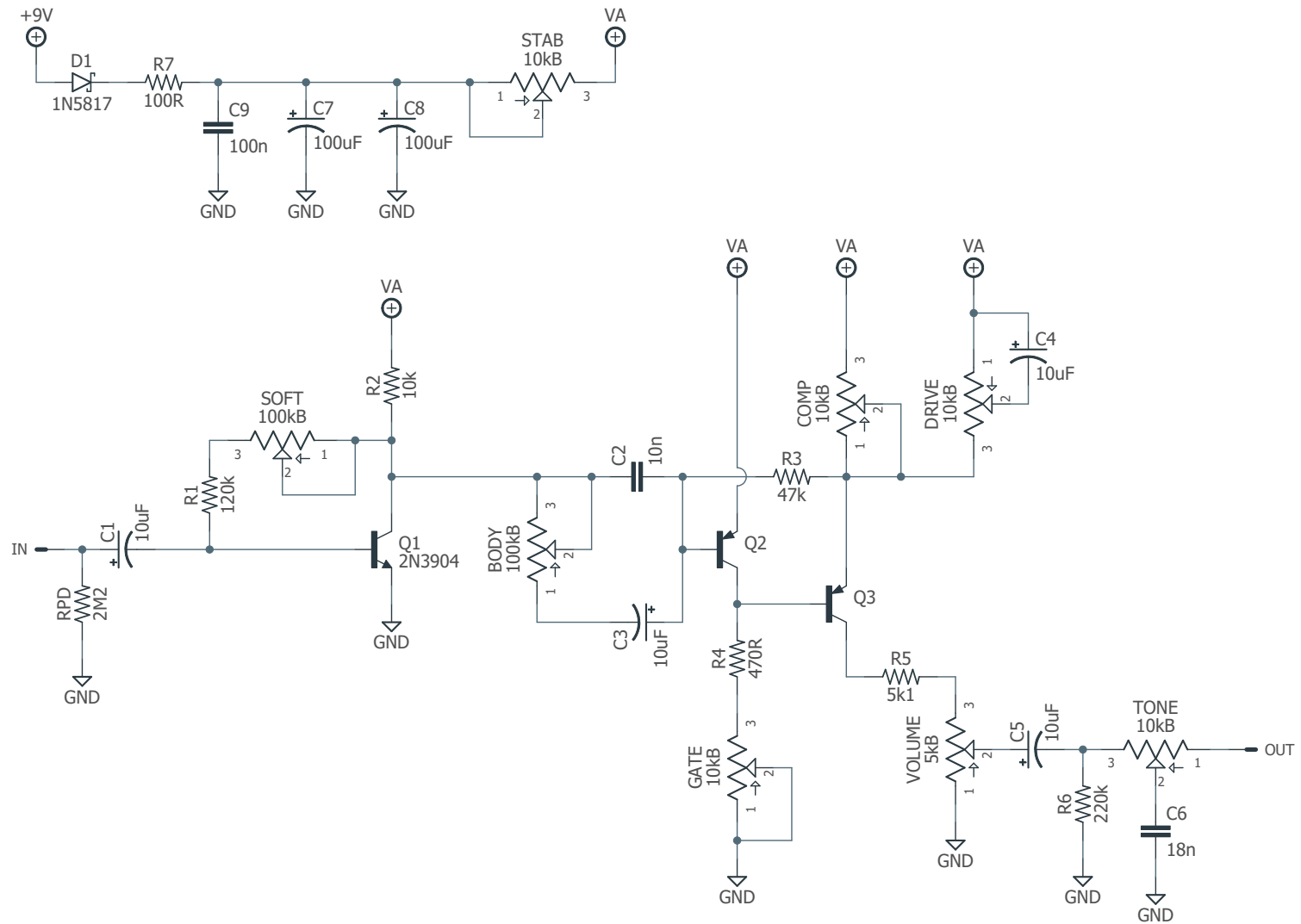
- **Drive:** 12:00 (center)
- **Volume:** 9:00
- **Comp:** 8:00
- **Stability:** 5:00 (full)
- **Gate:** 7:00 (off)
- **Soft:** 7:00 (off)
- **Tone:** 10 (full)
- **Body:** 8:00

Transistor selection

The original Fuzz Factory uses old-stock AC128 germanium transistors for Q2 and Q3, but any set that is suitable for a Fuzz Face will work here. It's recommended to buy a [matched set of Fuzz Face transistors](#) from Small Bear Electronics to ensure they're good quality.

You can also use silicon transistors (e.g. 2N3906) for Q2 and Q3. This gives a very different character than germaniums and there are plenty of people who prefer this version. It's also much easier to source the parts. Just make sure the pins lines up with the E-B-C pads for Q2 and Q3.

SCHEMATIC



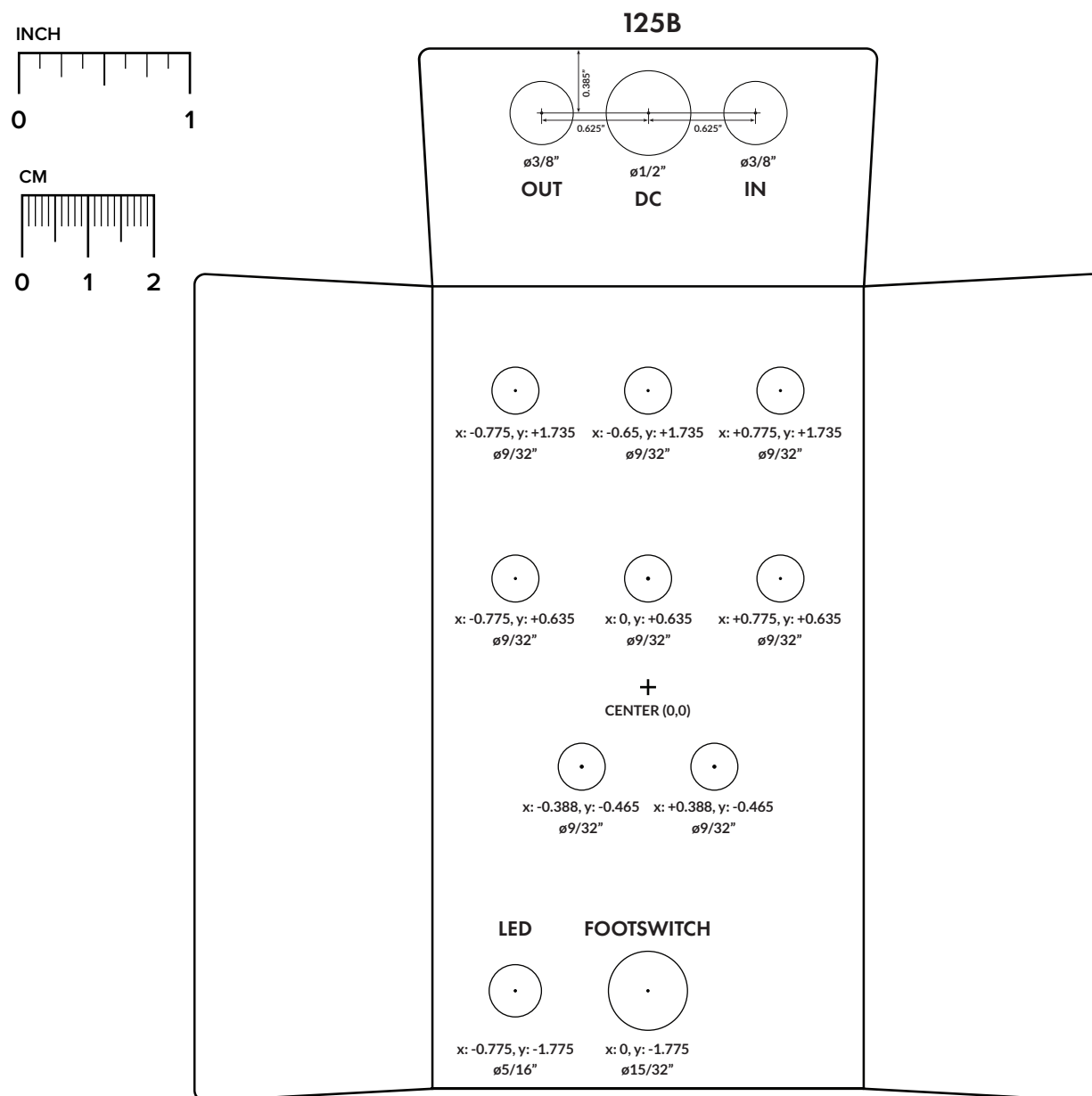
DRILL TEMPLATE

Cut out this drill template, fold the edges and tape it to the enclosure. Before drilling, it's recommended to first use a center punch for each of the holes to help guide the drill bit.

Ensure that this template is printed at 100% or "Actual Size". You can double-check this by measuring the scale on the printed page.

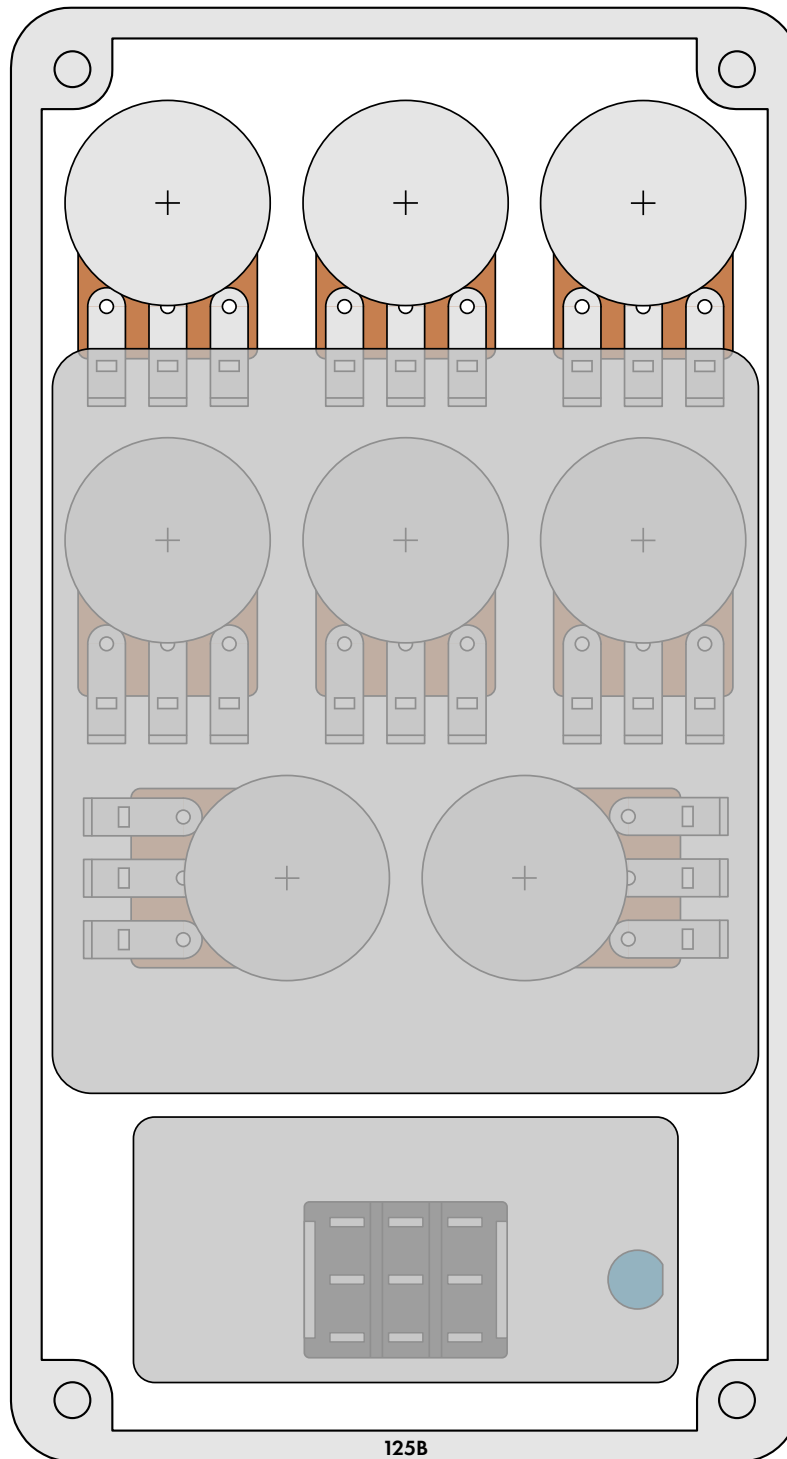
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). Open-frame jacks will not fit in layouts with 5 or more knobs due to the placement of the DC jack.

LED hole drill size assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.

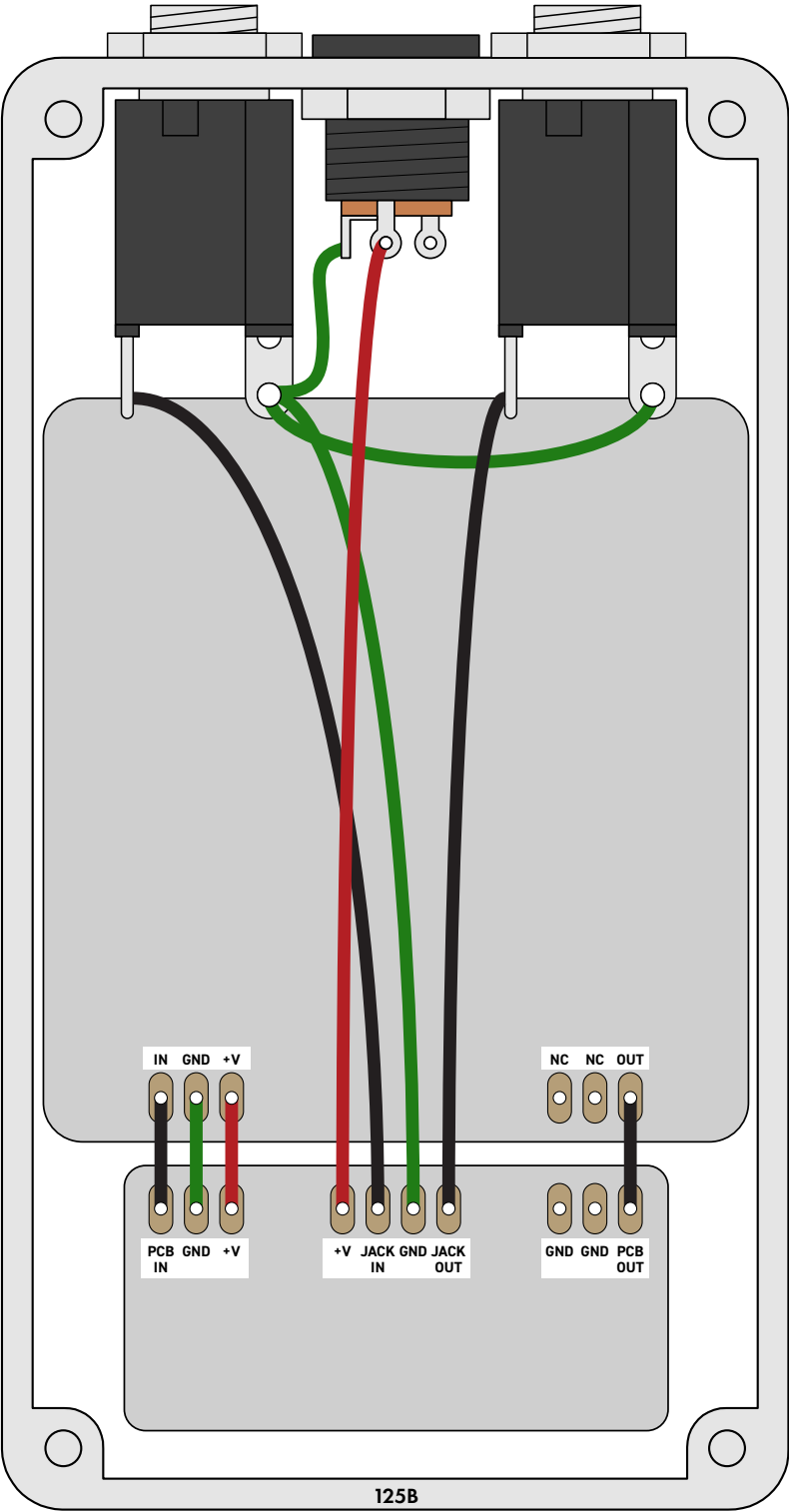


ENCLOSURE LAYOUT

Enclosure is shown without jacks. See next page for jack layout and wiring.



WIRING DIAGRAM



LICENSE & USAGE

No direct support is offered for these projects beyond the provided documentation. It's assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds cannot be offered unless it can be shown that the circuit or documentation are in error.

All of these circuits have been tested in good faith in their base configurations. However, not all the modifications or variations have necessarily been tested. These are offered only as suggestions based on the experience and opinions of others.

Projects may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though a link back is always greatly appreciated. The only usage restrictions are that **(1) you cannot resell the PCB as part of a kit without prior arrangement, and (2) you cannot “goop” the circuit, scratch off the screenprint, or otherwise obfuscate the circuit to disguise its source.** (In other words: you don't have to go out of your way to advertise the fact that you use these PCBs, but please don't go out of your way to hide it. The guitar effects industry needs more transparency, not less!)

DOCUMENT REVISIONS

1.0.1 (2024-08-08)

Changed LEDR to 10k to work with a wider variety of LEDs.

1.0.0 (2021-03-19)

Initial release.